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## ABSTRACT

Although many students simply do not visualize or draw very well, most students have capabilities and potentials that they, and perhaps their professors, are overlooking. Once elementary representations are mastered, it may be that drawing becomes progressively less of a learning tool as one moves through the educational system. But there is evidence to suggest that those earliest childhood experiences with drawing are better retained than is generally thought. In a formal experiment, 234 postsecondary level freshmen and sophomore students in English composition courses in a large metropolitan community college participated in a study in which they were asked to read a lengthy art history passage which was accompanied by photographs and illustrations. Students were then given time to draw what they had seen and remembered about the text and pictures. Over 90% of the subjects provided usable drawings that reflected their accurate recall of the topic. In terms of advertising, visuals have been thought to act either to retrieve memories associated with brands or as mnemonic devices. Student participation in the processing of complex symbolic visual materials requires cognitive participation and the reliance on learning. What is evident is that these students are not just seeing, but they have learned how to see and what to see to various degrees of expertise and preference. The development of perceptual and cognitive skills that enhance students' ability to critically examine visual information is a worthy goal for educators. (Contains 15 references.) (AEF)

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# Visual Exercises: A Quest For Alternative Measures Of Student Learning by Robert Sitz

## Abstract

You may have heard the refrain "... but I can't draw!" This appears to be a frequent lament when students are asked to execute an illustration, T.V. storyboard, or a visualization exercise. The reality is that all students can draw; drawing is a useful exercise; and there is much to be learned from this type of visual mediator. Theory, empirical evidence, and exercise results in the context of individual differences and information processing is discussed.

Although many students simply do not visualize or draw very well, most students have capabilities and potentials that they, and perhaps their professors, are overlooking. Drawing can be an extremely useful classroom activity for a variety of reasons, and this paper will demonstrate that there is much to be learned from this type of learning mediator.

Any college-age student has the capability of rendering simple stick figures or outlines of shapes. As young children, they were introduced to art by learning to copy simple shapes such as geometric figures (squares, circles, rectangles) or letterforms as a precursor to learning how to print. Many times, the young child was asked to outline a map as an aid to learning about the world. Then they moved on to the use of circular, ovoid, and stick-like representations of people and things; to creation and repetition of basic representational formulas. Finally, some detail was added to their drawings, including conventions that were learned for space and motion. Increasing degrees of visual correspondence to the shape, color,

and spatial location of objects marked the upper elementary years (Feldman, 1970). Granted, not everyone had the benefit of formal art training, but drawing experiences are an integral part of most elementary curriculums. Such a wide use of the term "drawing" may seem strange, but it is common. Wherever the essence of the task is to work with lines and shapes on a flat surface, the word "draw" is the usual referent (Goodnow, 1977)!

## Background

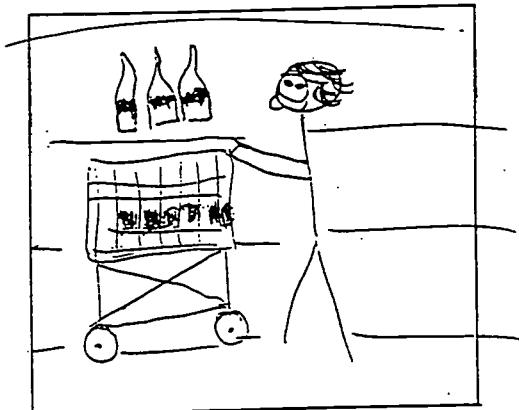
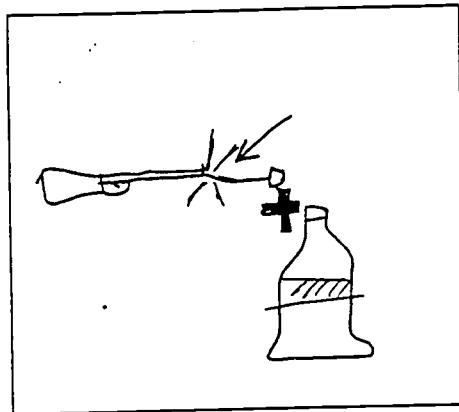
Once elementary representations are mastered, it may be that drawing becomes progressively less of a learning tool as one moves through the educational system. But there is some evidence to suggest that those earliest childhood experiences with drawing are better retained than is generally thought. In an advertising principles class, as part of an introduction to the creative process, this professor has asked students to participate in associational fluency exercises. In one such experience, students were asked to render drawings in response to a two word verbal

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cue, "pop bottle." The drawing results pictured (Figure 1) reveal a range of skill, but what is significant is that students are definitely successful at rendering intelligible illustrations and in many cases embellishing them with contextual detail.

In a second, follow-up exercise, students were asked to respond to the verbal cue Coca-Cola. As can be seen in the accompanying example pictures (Figure 2),

Figure 1 Examples of Three Different Student Drawings of "Objects"



greater visual elaboration is evident in their drawings. Most students have added detail and scenario. Again, a wide range of skill levels and quality is evident, but all students appear capable of at least a modest level of draftsmanship.

It should be noted that prior to the exercise (two days earlier), a formal presentation of a reel of Coke commercials covering a forty-year plus period of history had been presented to the class. This ensured that all

Figure 2 Examples of Student Drawings in Response to "Coca Cola" Verbal Cue

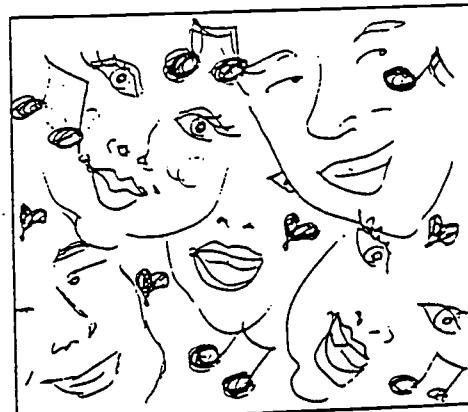
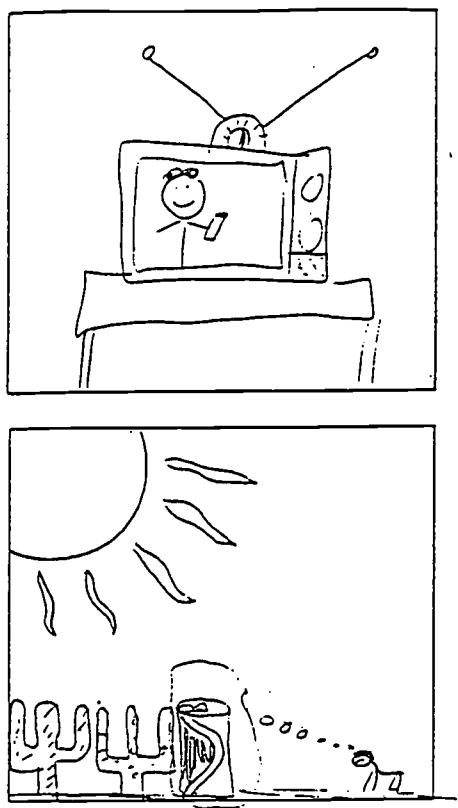


Figure 2-A: Additional Drawings to the Coca Cola Cue



students had some experience with Coca Cola imagery, even if it is possible that they had little background otherwise. This point will become more significant.

In a graphics and visual communications course, the film "Battleship Potemkin" (1925), edited by Sergei Eisenstein, was presented for viewing to demonstrate the editing concept called "quick cutting". "The Seventh Seal" (1956) by Ingmar Bergman is also shown and discussed. During follow-up class periods, students are asked to participate in a "visualization exercise" where they have to recall and draw their favorite scene from the film. Sample drawings from the study suggest that memory is vivid, and that most students are able to clearly express themselves through drawings (see Figure 3).

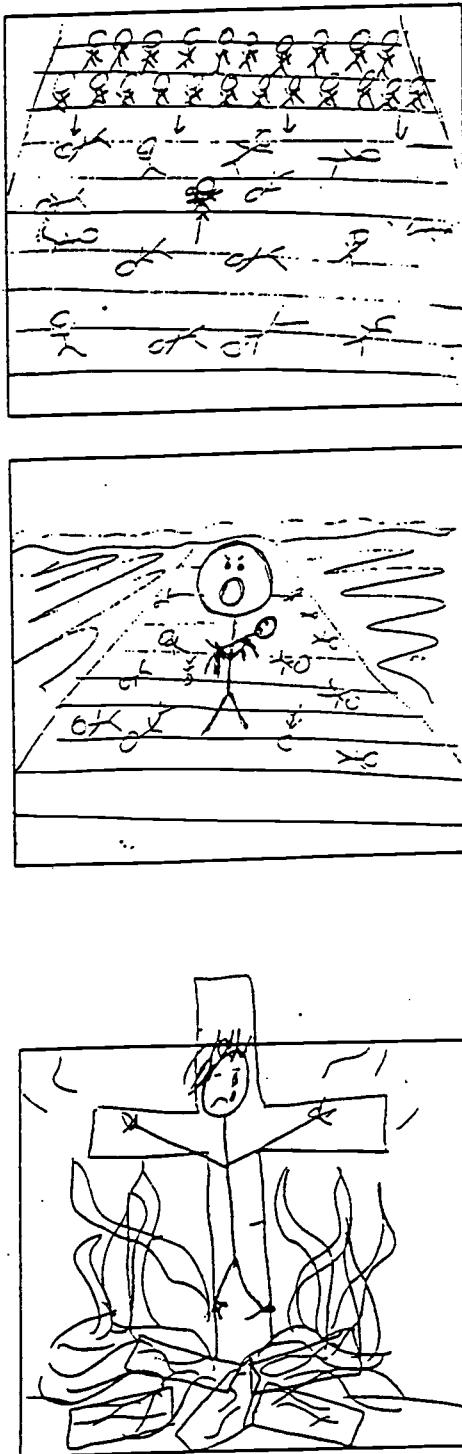
The level of detail recall is intriguing, and of course in this case, none of the students had prior knowledge of the subject matter or the film. It should be apparent that the assignment was considered more challenging than rendering pop bottles! Prior experience with the imagery, unlike the Coca Cola exercise, was not a factor here.

#### Empirical Evidence of Drawing Acumen

In a related formal experiment, 234 post-secondary level students (Freshmen/Sophomores) in English composition courses in a large metropolitan community college participated in a study that utilized drawing responses as the dependent measure. Students were asked to read a lengthy art history passage (1500 words) which was accompanied by photographs and illustrations. The subject matter was complex and the information density of the text was high. The textbook-like passages referred the reader to pictures and illustrations accompanying the assignment (see Figure 4). The visuals were included to provide further description and explanation of the subject matter about Greek vases. At the conclusion of a twenty-minute reading and studying the assignment, the student subjects were given time to draw what they had seen and remembered about the text and pictures.

Over 90% of the subjects provided usable drawings that reflected their accurate recall of the topic. The level of recall detail depicted in the drawings was quite surprising given the complexity of the subject (see Figure 5). Considering the predetermined lack of student background about the subject matter and their inexperience in art, the drawings results were impressive (Sitz, 1990).

Figure 3 Student Drawing Examples from Film Battleship Potempkin and the Seventh Seal



#### What Can Be Learned from Drawings?

Scholars involved in the psychology of art, perception, imagery, learning and memory have long had a stake in understanding both the process and the outcome of "children" drawing. Some see works of "art" as a reflection of very general phenomena of human life. Drawings and paintings may be regarded as an expression of our search for order in a complex world, as examples of communication, or more specifically as an indication of aspects of human development and skill. Drawings can also provide insight about the nature of thought and problem-solving (Goodnow, 1977).

Rudolph Arnheim is a seminal figure who has long used art to analyze visual perception and visual thought (Arnheim, 1966, 1969, 1974). In a recent article (1993), he alludes to an essay by Gabriela Goldschmidt titled "The Dialectics of Sketching" (1991) in which the author undertakes to answer the question of "What kind of reasoning" sketching (drawing) represents. It is suggested that sketching is not simply a matter of representing on paper the images that are held in a designer's mind, but rather it is a dialectic process that brings about a gradual transformation of information. The outcomes of this dialectic process could be revealed in the information content of drawings. This is a topic for future investigation.

The study of visual perception may be the most successful area of experimental psychology with steady progress made over the past 100 years. Although there has long been very sophisticated understanding of the nature of many visual phenomena, it is only recently that specifics about the processing of high level visual information has been possible. Today it is known that high level

Figure 4 Textbook Photographs

*Geometric and Orientalizing Styles  
(800–600 B.C.)*

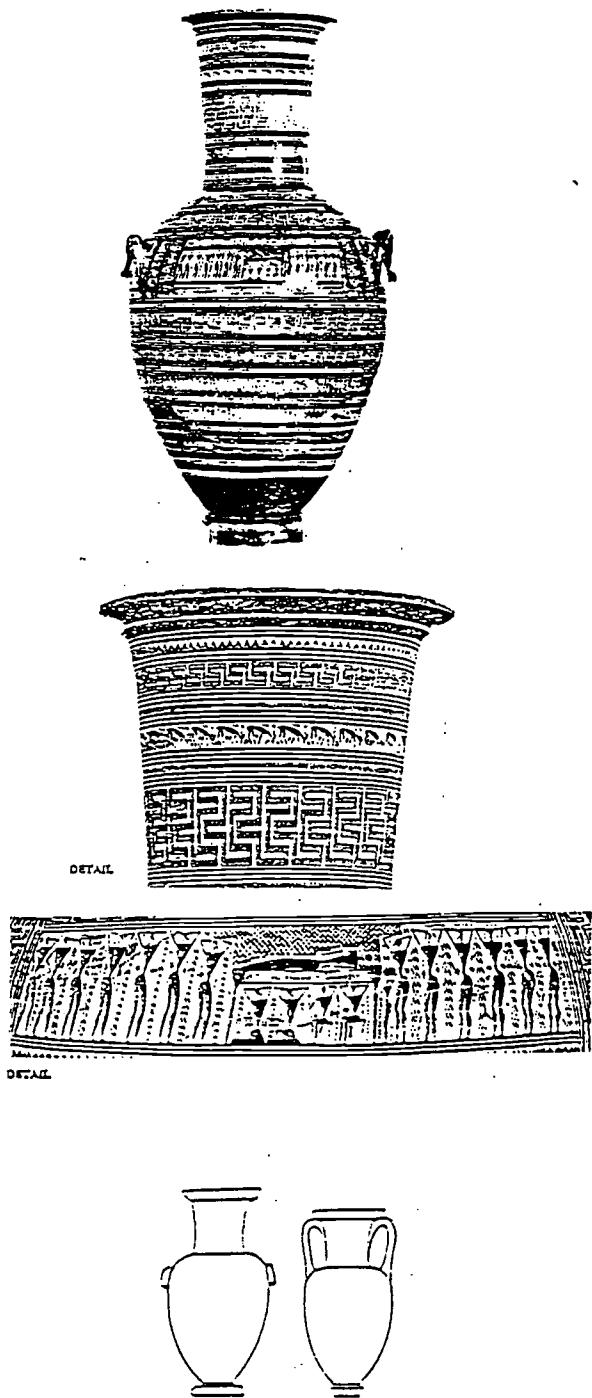
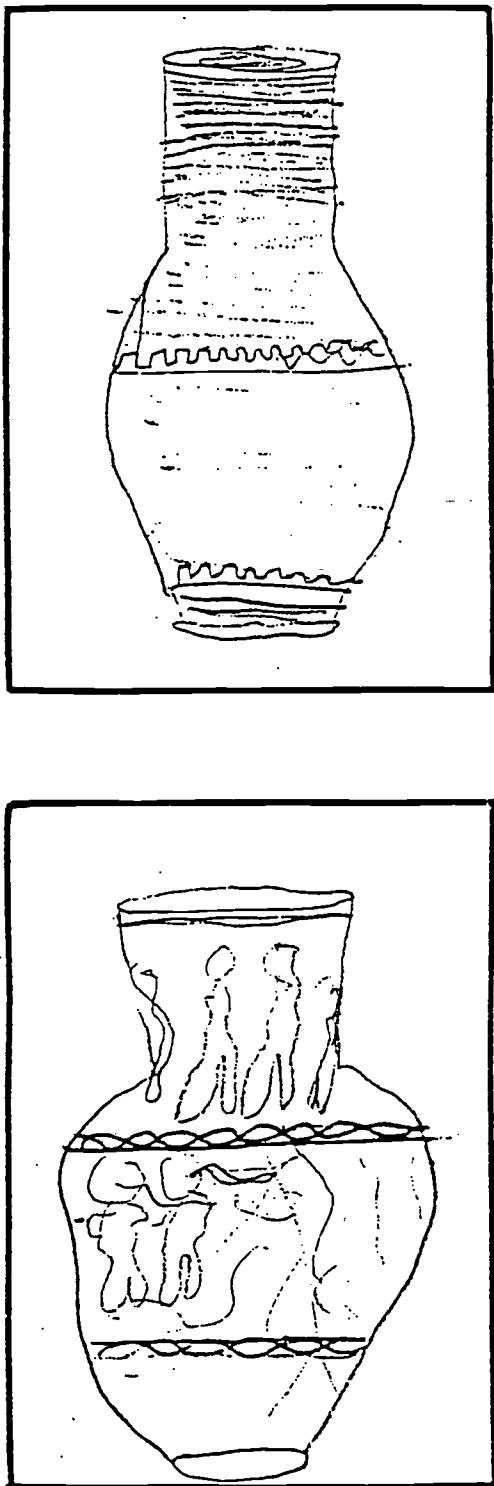


Figure 5 Examples of Student Drawing Responses and Recall of Complex Reading Subject Matter.



visual processing relies on previously stored information about the properties of objects and events. In general, "high-level" information processing refers to cognitive dimensions of perception. It is believed by some that if a theory of high-level cognitive perception can be developed, considerable leverage in understanding imagery will be achieved (Kosslyn, 1994). Therefore, one recent concern of the research on visual information processing has been imagery production.

In terms of advertising, visuals have been thought to act either to retrieve memories associated with brands or as mnemonic devices. The function of images has therefore been tied to memory rather than to imagination. This orientation continues to have impact since imagery production is conceptualized as the retrieval and manipulation of real objects and experiences. According to Scott (1994), the imaginative visual itself is yet to be considered, "... nor has the link between notions of 'image,' 'imagery,' 'imaginary,' and 'imagination' been explored" (MacInnis, 1992). In the previously alluded to non-scientific classroom experiences with the terms pop bottle and "Coca Cola," the drawing evidence fails to reveal whether the elaborate pictorial contexts are the result of memory, imagination, or some interaction. But perhaps for classroom purposes, resolution of the issue is not important.

What appears to be most significant is the realization that student participation in the processing of complex symbolic visual materials like illustrations, photographs, and advertising messages requires cognitive participation and the reliance on learning. Additionally, objects are translated into drawings by the process of representation using certain conventions that have been

learned (Gombrick, 1960). What is evident is that these students are not just seeing, but they have learned how to see and what to see to various degrees of expertise and preference. Their attention to specific types of information detail is revealed to some extent in their drawings. Somehow, they have selected certain dimensions of the subject matter, probably determined by a combination of what they have learned and know, what they believe and want. The type of sensory input provided in the classroom exercises has evoked a variety of responses in the form of different images revealing probable individual differences in experiences, attitudes, interests and quite possibly such physiological characteristics as eye-hand coordination and ability to concentrate (Berger, 1989).

It has been argued that imagining and seeing are fundamentally different. That "cognitive maps" and "object schematics" that appear as images when they are standing alone are really parts of a perceptual cycle that includes many ongoing activities. People are "seeing" because they elect to select out parts of the perceptual cycle. On the other hand, where the object stands alone, it is imagining, not seeing. However, anyone who has to make mental preparation to pick up information specifying particular detail about certain objects must be able to imagine that object. The exercises described herein require just such preparation by the students. Whatever the activity, seeing or imagining, the ability to "divide, detach, and manipulate our own anticipations is immensely important." In Neisser's words (1976), these are the fundamental operations in all higher mental processes. Imagery expressed through drawings may be one example revealing ability as it pertains to the so-called "higher mental processes."

### Individual Differences: Implications

One of the many objectives of education is the cultivation of critical thinking. The development of perceptual and cognitive skills that enhance the students' ability to critically examine visual information is a worthy goal, particularly as it relates to inducing students to learn about the details that drive the visual impact and memorability of subjects like advertising. Students learn to see the nuances of good advertising design versus poor design, the detailed flourishes that are the sign of differences between serif and san serif typographic styles, or the distinctive shapes that define corporate graphic marks. But, individuals differ in their information processing habits relative to perceiving, thinking, problem solving and remembering such details. One hypothesis is that some individuals are better able to separate out detail information from an overall context through analysis and structuring than are others. It has been suggested by the Cognitive Style theory of Field Independence-Field Dependence that people will differ significantly in terms of thought strategies when recalling information. For example, Field Independents are thought to be able to identify important visual cues regardless of whether or not they are made salient. On the other hand, information recall is hindered in the case of Field Dependent individuals if visual cues are not obvious (Witkin, et al., 1977; cited by Moore, 1985).

In advertising, of course, a variety of design techniques and visual cues "help" the consumer access the priority (or importance) of information elements. This is accomplished through subtle means like emphasis, eye gaze, sequencing, and other cues that are salient -- like arrows. However, in the classroom learning environment, the variety and density of information should be, and usually is, much greater than is

evidenced by the typical 30 second advertising spot or print advertisement. The point being that external structuring and organizing of information by the instructor or textbook designers could be even more important, particularly as it might relate to Field Dependent students. Drawing exercises have the potential to force students to critically examine and concentrate on information, and at the same time to varying degrees reveal the nature of the information the student processes. Is the student processing the critical information that has been cued by the instructor, or is the student attending to extraneous matters that may interfere with learning?

### Conclusion

The use of visual imagery as a form of learning mediation has attracted increasing attention in recent years with studies by Paivio (1986) and Kosslyn (1994), and others. Although the concept of imagery remains controversial in memory research, it is apparent that we have moved beyond reliance on introspective self-reports. Drawings have been used frequently in memory experiments, and by inference, it would appear that they could have a niche in the classroom alongside verbal measures of student knowledge and understanding in addition to what they may yield in regard to understanding imagery.

What is intriguing about student drawings is that they appear to have potentials beyond the strict measurement of imagery vividness or memory about objects and other specific referents. Many of the drawings come with context provided by the composition's background. In some cases, the context helps to clarify the learned referent the student was inadequate to the task of rendering through drawing skill. Where the student is unable to select the symbolic drawing conventions necessary to depict the object properly, supplemental illustrative

background can help to clarify intended meaning. In other words, contextual background helps the viewer to understand the "message." Student drawings are often submitted embellished with background detail or with verbal balloons, captions, and other notations (even when the instructions are "not to use words"). The background or contextual information is interesting and in some ways revealing in regard to student interests, sense of humor, attitude, and so on.

The most obvious and long-standing justification for the use of drawing exercises in the classroom has to do with creativity. Image generation has been likened to a kind of attentional priming in which the representation of an idea in associative memory is accessed. Visual images are somehow generated when we recall previously seen objects or events, or when "objects" are combined in novel ways, or when patterns that have never actually been seen are "mentally drawn" (Kosslyn, 1994). Students certainly differ in terms of associational and ideational fluency as measured by verbal tasks. One can presume that similar findings could prevail in terms of "associational" and "ideational" fluency as it pertains to drawing exercises.

In advertising, it is taken for granted that good copywriters and art directors have excellent visual imagination and "fluency." Writers paint pictures with words, so being able to see products, people, and scenes in the mind's eye is important. Designers must be able to manipulate the elements of a print layout or sequence the frames of a T.V. commercial, visualizing the desired outcomes (Wells, Burnett, Moriarty, 1995). So as part of the preparation of students for these professions, it would seem to be axiomatic that drawing exercises would be an on-going part of classroom activity. Even if the student aspires to professional activity outside the creative sphere, it would appear

that the kind of thinking and use of the "mind's eye" that is inherent in drawing exercises would be beneficial. Creative problem solving, planning, strategic thinking, and decision making require use of the higher order visual perceptual processes.

### Summary

It is clear that all students have the ability to render coherent representations of both real and imaginary "visions" through the act of drawing. The process of creating "art" requires the use of critical thinking skills, visual imagery and memory. Drawings can be revealing in terms of individual differences in information processing, creativity, attitudes, personality and talent. Empirical evidence suggests that drawings may measure more of what people know than the verbal counterpart in certain instances. Besides, students have fun doing visualization exercises! Why not use them more often?

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